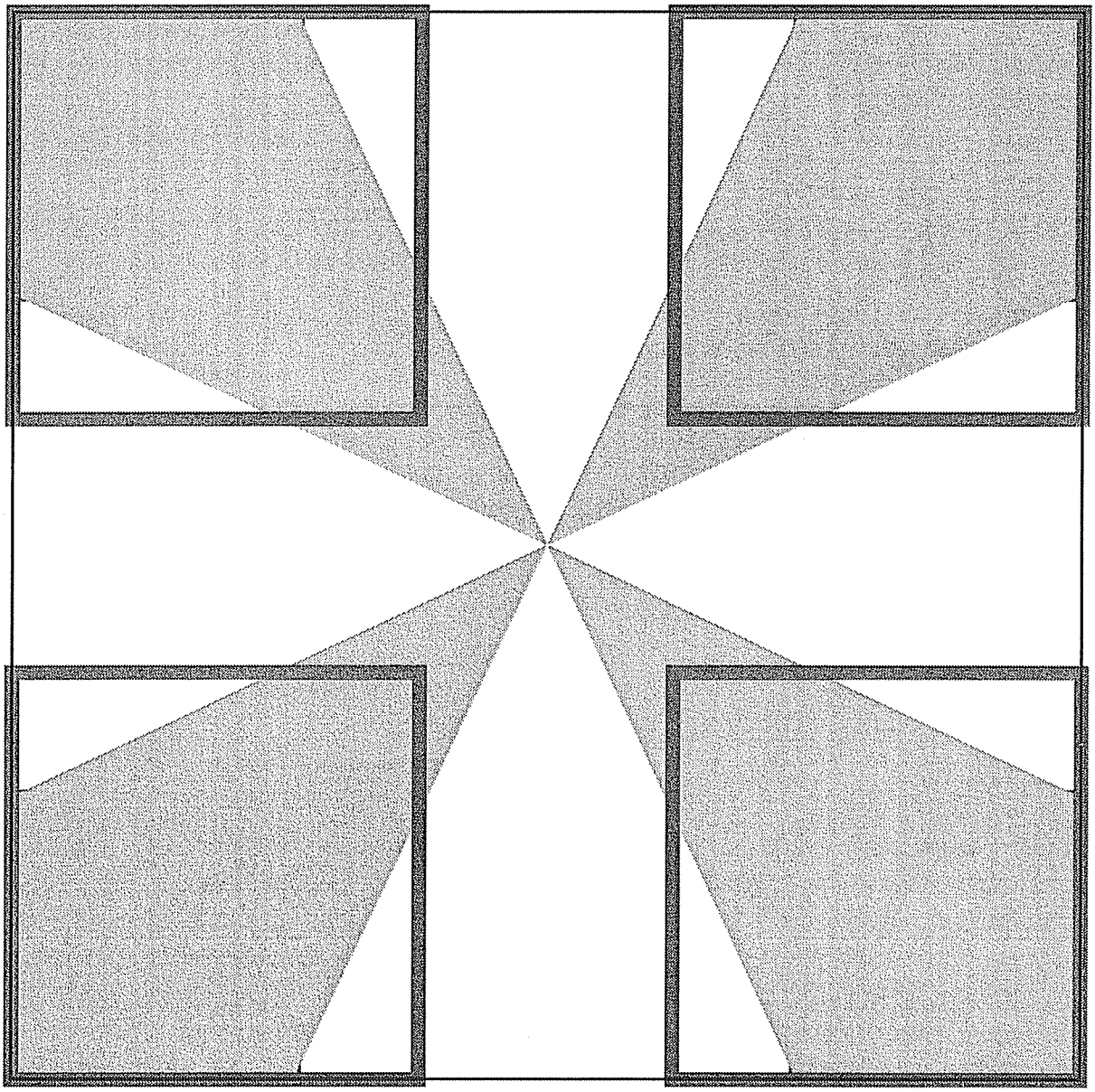
Abacus

A Publication of the OAME ■ Volume 31 ■ Number 1 ■ September1992



Edited by

Amy Parker ■ Peel Board of Education

CONTENTS

FROM THE DESK OF THE ABACUS EDITOR / PAGE2

CHOOSE A NUMBER / PAGE 2

GRADE 9 REVIEW / PAGE 3

GRADE 10 REVIEW / PAGE 4

GRADE 11 REVIEW / PAGE 5

GRADE 12 REVIEW / PAGE 6

CALCULUS REVIEW / PAGE 8

FROM THE DESK OF THE ABACUS EDITOR

In this issue of the Abacus, you will find "Choose a Number", a mathematics game by Lorna Morrow. The remainder of the issue is devoted to a set of review exercise sheets which has a special twist. For example, the grade 9 sheet has thirty four questions. The answers to these questions are, respectively, 1, 2, 3, ... , 34.

These exercises and more were submitted by Gunter Ballweg, Russ Garrett, Marilyn Hurrell, Al McLean, Michelle Rittau, and Gerry Vervoort, all of NWOAME. More such sheets will be included in future issues.

CHOOSE A NUMBER

FOR: 2 TO 6 PLAYERS

SKILL: ARITHMETIC OPERATIONS

MATERIALS: 2 REGULAR DICE, A 6 BY 9 GRID FOR EACH PLAYER

RULES:

1 Each player rolls the dice in turn and either adds, subtracts, multiplies, or divides to get a number he/she wants.

2 The player then places that number in one of the squares on his/her grid.

3 Play continues until each player's grid is filled.

4 Players then circle equations on their grids. Equations may be horizontal, vertical, or oblique, but must be in a straight line. Equations may have from 3 to 6 numbers.

5 The player who circles the most equations on his/her grid is the winner.

See the example. Players may decide to allow this overlap or not.

VARIATIONS

1 Player A rolls the dice, 'makes' a number for his/her grid, and each player must place that number on his/her grid. This continues for every player's turn at the dice.

2 Change the size of the grid.

GRADE 9 REVIEW

1 $[(-1+9)\div 8]^7 =$

2 $\sqrt{121}-\sqrt{81}=$

3 $(2^4-1)+(2^2+1)=$

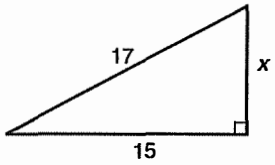
4 $4(0.1)^6(\text{million})=$

5 $-12+6\div 3+3\times 5=$

6 $3\frac{1}{5}\div\frac{8}{15}=$

7 Solve: $32-3x=11$

8 Determine x.



9 $(0.3)^{-1}(0.1)(\frac{1}{3})^{-3}=$

10 A cyclist averages 15 km/h. How far does she get in 40 min?

11 $(40\frac{1}{2}-36\frac{4}{7})\div -\frac{5}{14}=$

12 $(7.2\times 10^{-1})\div(60\times 10^{-3})=$

13 Find the diagonal of a rectangle that is 5 m by 12 m.

14 $56+17(3-4)^5-5^2=$

15 Solve $0.\overline{3}x=5$.

16 Solve $2^{\frac{48}{x}}=8$.

17 44° more than twice the complement of an angle is 190°. Find the angle.

18 Tom, Dick and Harry divide 39 marbles in a ratio of $\frac{1}{2}:\frac{1}{3}:\frac{1}{4}$. How many did Tom get?

19 If $c=12$, $d=14$, $\frac{3}{4}c+\frac{5}{7}d=$

20 Find the smallest of three consecutive even numbers whose sum is 66.

21 The perimeter of a rectangle is 31 m. Its length is 1 less than 10 times its width. Find the area of the rectangle.

22 If $f(x)=34-3x+\frac{x^2}{6}$, $f(12)=$

23 $-5(-2m-6)-3(m+2)-(1+7m)=$

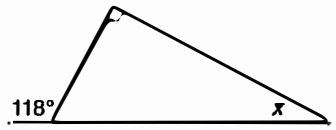
24 Find the slope of the line through the points (–4,11) and (–5,–13).

25 $(0.1)^6(5000)^2=$

26 Find the coefficient of ab in $(2a-b)^2-5a(a-6b)$

27 $(3+4\frac{1}{2})(1\frac{1}{15}\times 3\frac{3}{8})=$

28 Calculate x.



29 $5^{\sqrt{4}}+4^{\sqrt{1}}=$

30 Calculate 5% of $600.

31 Twice an angle minus its complement is 3. Find the angle.

32 $[10^2-2^2](3^{-1})=$

33 $(3^2+2^2-2x5)\sqrt{121}=$

34 Solve $0.3x+5=15.2$

GRADE 10 REVIEW

1 $[(-1+9)\div 8]^4 =$

2 $\dfrac{\sqrt{12}+\sqrt{48}}{\sqrt{27}} =$

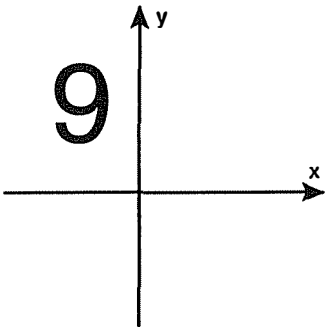
3 Find the slope of a line perpendicular to $x+3y=7$.

4 In which quadrant is (3,-2)?

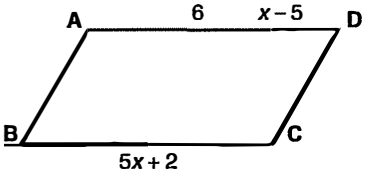
5 Solve $\dfrac{1}{2}x-6y=-95$ and $4x-2y=-43$.

Find $x+11$.

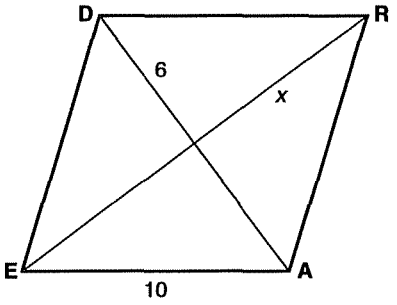
6 Reflect 9, first about the *y*-axis, then about the *x*-axis.



7 ABCD is a parallelogram. $x=$



8 DEAR is a rhombus. $x=$



9 The *y*-intercept of $3x+2y-18=0$.

10 $\sqrt{762\frac{1}{2}-(16\frac{1}{2})(1\frac{7}{11})} =$

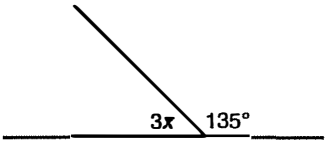
11 $(40\frac{1}{2}-36\frac{4}{7})\div\frac{5}{14} =$

12 $|-8|+|-6|-|-2| =$

13 State the coefficient of the *xy* term in $(2x+3y)^2+xy$.

14 $56+17(3-4)^5-5^2 =$

15 Calculate *x*.

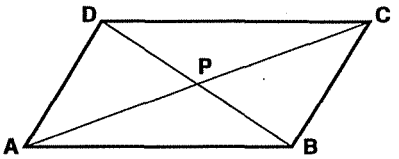


16 If 13 diagonals can be drawn from each vertex of a convex polygon then how many sides does the polygon have?

17 44° more than twice the complement of an angle is 190°. Find the angle.

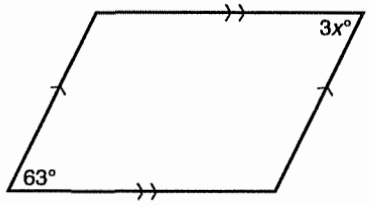
18 A line through (-2,24) and (7,-3) has a *y*-intercept of?

19 ABCD is a parallelogram $|AP| = 9.5$ cm. Find $|AC|$.



20 $(3\sqrt{24})(\sqrt{6})(\dfrac{4\sqrt{48}}{\sqrt{3}}) =$

21 Calculate *x*.



22 What is the mean of 43, 16, 28, 11, 20, and 24.

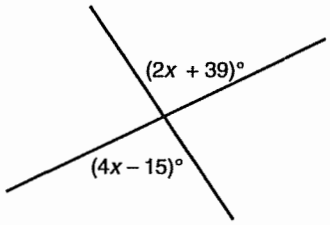
23 Solve $\dfrac{231}{379\frac{1}{2}} = \dfrac{14}{x}$

24 $\dfrac{7\frac{3}{10}+8\frac{3}{5}}{0.6625} =$

25 A farmer counted 48 heads and 142 feet. Having only cows and chickens how many chickens has he?

26 If $A=(-3,10)$ and $B=(7,-14)$. Find the length of AB.

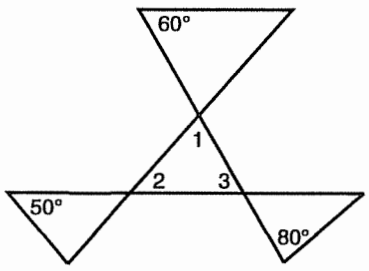
27 Calculate x.



28 $56 \div (0.5)^{-1} =$

29 $\dfrac{-29x+58}{2-x} =$

30 $(\angle 1 + \angle 2 + \angle 3) \div 6 =$



GRADE 11 REVIEW

1 $624^{\frac{1}{2}} \times 5^{-2} =$

2 (-1,7) is the midpoint of (-10,8) and (x,y). Find $x - y$.

3 The positive x-intercept of $5x^2 - 11x - 12$ is?

4 Solve $16^{(x-7)} = \dfrac{1}{8^x}$.

5 $x+1$, $x+7$, and $2x+14$ form a geometric sequence. Find x.

6 $3^{(x-y)} = 9$ and $27^y = 3^{(x+2)}$. Find $x + y$.

7 In an arithmetic sequence $t_1 + t_3 = 10$ and $t_2 + t_4 = 24$. Find d.

8 What is the maximum value of $y = -2x^2 - 4x + 6$?

9 If $f(x) = 10 - \dfrac{2}{3}x$, find $f^{-1}(4)$.

10 If $A=(2,-3)$, $B=(-2,-6)$ find $2\,|AB|$.

11 Find the discriminant of $\dfrac{1}{2}x^2 - 9x + 35 = 0$.

12 $8 + 2 + (-4) + \ldots + t_n = -300$. Find n.

13 If $f(x) = x^2 + 1$, $g(x) = x + 3$. Evaluate $g(f(-3))$.

14 $8^{\frac{1}{3}} - 6^0 - (\dfrac{1}{9})^{(-\frac{1}{2})} + 32^{\frac{4}{5}} =$

15 $\dfrac{(\frac{1}{2})^{(-2)} - 2^{-2}}{2^{-2}} =$

16 If $x = 32$ then $x^{0.16} \div x^{-0.64} =$

17 If $t_1 = -2$ and $t_n = 2t_{n-1} + 1$ find $(-1)t_5$.

18 In a geometric sequence $t_3 = 2$ and $t_8 = 48$. Find t_5.

19 Find the *y*-intercept of $y = -2(x+3)^2 + 37$.

20 $\sum_{n=1}^{4} 4(\frac{n}{2}) =$

21 If $100 is invested at 20%/a. compounded semi-annually, how much interest is earned in one year?

22 3,7,11,15,.... Which term has value 87?

23 The sum of the coordinates of the vertex of $y = -2x^2 + 20x - 32$.

24 In a geometric series $s_5 = 186$, $s_6 = 387$ and $t_4 = 48$. Find t_3.

25 $|DF| = 35$. *E* divides *DF* externally in the ratio 12:5. Find $|EF|$.

26 -25, -22, -19, ... find t_{18}.

27 Area of a rectangle with diagonal $\sqrt[3]{10}$ and one side 3.

28 Find the geometric mean of 98 and 8.

29 If $f(x) = 5x - 3$ find $f(f(1.88))$.

30 The range of $y = 5x^2 - 20x + 50$ is $\{y \in R \mid y \geq b\}$. Find *b*.

31 Given a segment *AB* with midpoint (25,2), and *A* = (19,7). *B* is in the fourth quadrant. Find the *x*-coordinate of *B*.

32 If $f(x) = \frac{1}{8}(2^{x-3})$ find $2f(10)$.

33 Find the product of the roots of $2x^2 - 32x + 66 = 0$.

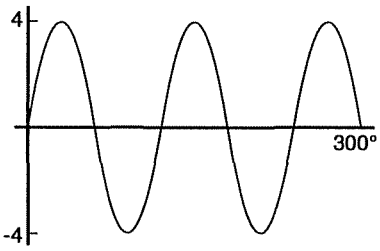
34 $(0.5)^{-1}[(\frac{1}{6})^{-2} \div 2 - (\frac{1}{5})^0] =$

GRADE 12 REVIEW

1 Evaluate $\left|\sqrt{1} + \sqrt{9} - \sqrt[3]{8} - \sqrt{9}\right|$.

2 $\frac{3^{-2} + 3^{-1}}{3^{-1} - 3^{-2}} =$

3 The given graph is $y = 4\sin k\theta$. Find *k*.



4 Solve $\log x + \log(x+21) = 2$.

5 $f(x) = x^2 + 1$, $g(x) = 4 - x$. Evaluate $fog(6)$.

6 $(1000^{\frac{1}{3}})(25^{\frac{-1}{2}}) + 32^0 + (\frac{1}{9})^{\frac{-1}{2}}$

7 Find *k* if $x - 2$ is a factor of $2x^3 - kx^2 + 3x + 6$.

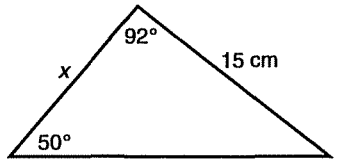
8 Solve $x^4 - 63x^2 - 64 = 0, x > 0, x \in R$.

9 If $f(x) = 10 - \frac{2}{3}x$, find $f^{-1}(4)$.

10 If $f(x) = x^2 + 1, g(x) = 10 - 2x$, find $fog(3.5)$.

11 $\log_2 128 - \log 1 + 3^{\log_3 5} + \log_5 0.2 =$

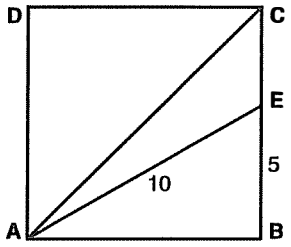
12 Find *x* to the nearest centimetre.



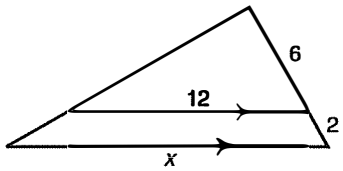
13 Solve $2x^3 - 39x = 23x^2, x > 0, x \in R$.

14 Find the sum of the roots of $x^2 - 14x = 72$.

15 $ABCD$ is a square. Calculate the measure of $\angle CAE$.



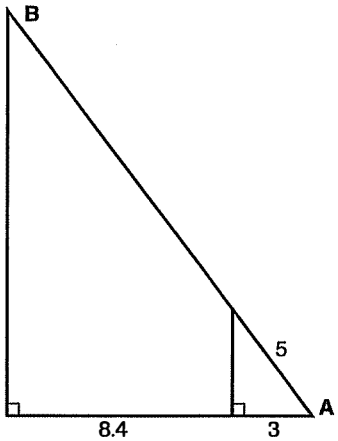
16 Calculate x.



17 44° more than ~~twice the complement~~ of an angle is 190°. Find the measure of the angle.

18 $\frac{5x^3y^2}{3x^8y^6} \times \frac{6x^2y^3}{25x^4y^3} \times 45x^7y^4$

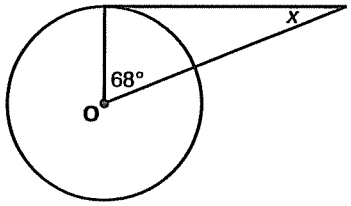
19 Calculate AB.



20 $3\sqrt{24}\sqrt{6} - \frac{4\sqrt{48}}{\sqrt{3}}$

21 One focus for $\frac{x^2}{841} + \frac{y^2}{400} = 1$ is $F_1 = (c, 0)$.. Find c.

22 Calculate x.

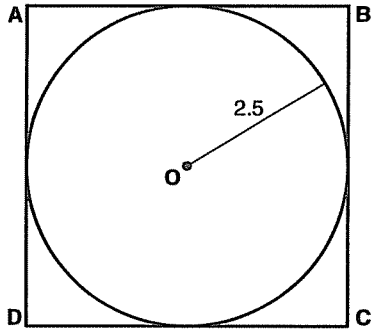


23 For $\frac{x^2}{225} - \frac{y^2}{64} = 1$, calculate

$\frac{1}{2}$(transverse axis + conjugate axis).

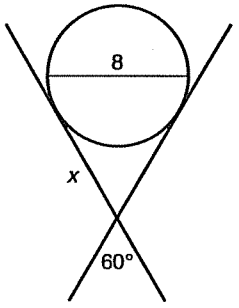
24 $18\cos 60^o + 10\sqrt{3}\sin 60^o =$

25 Calculate the area of $ABCD$ (a square).



26 Find x, the number of degrees $0.\overline{14}\pi^r = x^o$.

27 Calculate x.



28 The domain of $y = \sqrt{x^2 - 45}$ is $|x| \geq a$ where a is an integer. Find $4a$.

29 Find the discriminant of $x^2 = 5x + 1$.

30 Solve $2\log_3 x - \log_3(x-5) = \log_3(x+6)$.

CALCULUS REVIEW

1 $\int_0^{\frac{\pi}{2}} \cos x dx =$

2 $\frac{d}{dx}\left(\ln\left(e^{2x}\right)\right) =$

3 Find the ordinate of the local maximum of the curve $y = x^3 - 2x^2 - 7x - 1$.

4 $\int_0^8 \frac{1}{\sqrt{1+x}} dx =$

5 The curve $y = ax^2 + bx + c$ passes through (2,5) and (–2,–3). The value of y is greatest when $x = 1$. Find the value of c.

6 Find b given that $y = x^3 + ax^2 - 3x + b$ has a point of inflection at the point (1,1).

7 Find c so that the line $y = 4x + 3$ is tangent to the curve $y = x^2 + c$.

8 Calculate the area between $y = 3x$ and $y = x^3 - 6x^2 + 11x$.

9 $3 + 2 + \frac{4}{3} + \ldots =$

10 Find the slope of the tangent to $y = x^3 - 2x$ when $x = -2$.

11 $f(2) = 25$ and $f'(x) = 9x - x^3$. Find the relative minimum value of f.

12 $f(x) = \ln x^{12}, f'(1) =$

13 $\int_0^1 (18x + 4) dx =$

14 $\int_0^2 (3a^2 + 2a + 1) da =$

15 $\lim_{x \to \infty} \frac{(6x-1)(5x+2)}{2(x-\frac{1}{3})^2} =$

16 If $ax + by = c$ is the equation of a tangent to $\frac{x^2}{25} + \frac{y^2}{16} = 1$ at $(4, \frac{12}{5})$ find a.

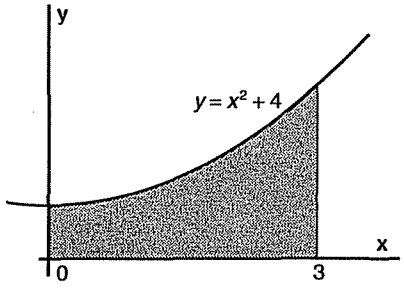
17 Find the maximum value of $y = 1 + 12x - x^3$.

18. What is the maximum possible area of an isosceles triangle if the two equal sides are each 6 cm long?

19 If the equation of the tangent of $y = x^{\frac{1}{2}} + x^{-\frac{1}{2}}$ at (4,2.5) is of the form $by = ax + c$. Find $a+b$.

20 If a brass sphere 1 cm in diameter is given a chrome plating 0.005 cm thick, then the volume is increased by $\frac{1}{4} k\pi$ mm^3. Find k.

21 Find the area of the shaded region.



22 Find the x-intercept of the normal to the curve $y = x^2 + 1$ at $x = 2$.

23 Find the area above the x-axis and below $y = 8x^3 - 3x^2$ for $1 \le x \le 2$.

24 Ben Casey hit a home run into the bleachers where the ball fell into the outstretched hands of I.M. Perfect at the height of 5 m above the ground. If the height of the bat at time, t, was $h = 26t - 5t^2$ determine the rate of vertical descent of the ball at the instant it was caught.

25 The Lakehead Bus company offers charter tours. A minimum of 10 people must sign up for each tour. The price per person is $40. The company will reduce the fare by $1 for each additional passenger. What number of tourists will give the greatest revenue?